Mexican-American/White Non-Hispanic Disparities in Oral Health.

By
Isabel Garcia, Ph.D.
&
Thomas F. Drury, Ph.D.

National Institute of Dental & Craniofacial Research

❑ Introduction

Background

Mexican-Americans comprise approximately 64% of all Hispanics living in the U.S. and are the fastest growing Hispanic subgroup. Previous studies from the first phase of NHANES III (1988-91) point to disparities in oral health status between Mexican-Americans and non-Hispanic populations. Because socioeconomic characteristics such as income and educational attainment are known to influence health and health care utilization, it is important to examine whether these noted differences in oral health can be explained by inequalities in SES.

Objectives

- To identify overall disparities between Mexican-American and White non-Hispanics among U.S. adults with respect to key aspects of oral health reflective of unmet needs.
- To evaluate whether any of these disparities were accounted for by variation in the age and gender composition of the two populations.
- To evaluate whether socioeconomic status (SES) and recency of dental visits (RDV) account for Mexican-American/White non-Hispanic disparities in adult oral health.
- To evaluate the role of potential two-way interactions between racial-ethnic background and age, gender, SES, and a recent dental visit in conditioning the magnitude of any existing disparities.

❑ Methods

Source of Data: 1988-1994 National Health and Nutrition Examination Survey (NHANES III)

Study Populations:

- 2,530 Mexican Americans and 5,206 White Non-Hispanics ≥35 years of age
- 4,386 dentate Mexican-Americans and 5,570 dentate White non-Hispanics ≥18 years of age
- 4,261 dentate Mexican-Americans and 4,773 dentate White non-Hispanics 18-74 years of age

Table 1 presents demographic characteristics of the major study populations by gender, age, SES and a recent dental visit.

Measurement

Clinical data were obtained through visual-tactile oral examinations conducted in Mobile Examination Centers (MECs) by trained and calibrated examiners.

Information on individual educational attainment, annual family income, age, gender, race/ethnicity, and a recent dental visit was gathered through family and personal interviews.

SES was measured by a composite index based on individual educational attainment and the ratio of annual family income to the official U.S. poverty threshold. This index was grouped into four approximately equal categories describing persons with lower, lower middle, upper middle, and higher SES index scores.

Variables Used in Analyses & Their Definitions *(in alphabetical order)*

- Advanced Loss of Attachment: Person has either 2 sites with ≥4+mm of LOA or 1 site with LOA ≥6mm.
- Any Untreated Decay: Person has one or more coronal or root tooth surfaces with untreated decay.
- Edentulism: Person has no natural teeth.

- Gingivitis: Person has one or more gingival bleeding sites.
- Gingival Recession: Person has one or more sites with gingival recession of ≥1mm.
- Loss of Attachment (LOA) of 4+mm: Person has one or more sites with LOA ≥ 4mm.
- Recent Dental Visit: Person reported visiting a DDS or RDH in past 12 months.
- Restorations and Tooth Conditions (RTCs): Person has one or more oral conditions that compromises structural integrity or causes dysfunction or disease.
- Restorations and Tooth Conditions (RTC) involving intracoronal restorations: Person has one or more RTCs involving intracoronal restorations.
- RTC involving gross loss of tooth structure: Person has one or more RTCs involving gross loss of tooth structure.
- RTC involving pulpal pathology or a retained root: Person has one or more RTCs involving pulpal pathology or a retained root.
- Untreated Coronal Decay: Person has one or more coronal tooth surfaces with untreated decay.
- Untreated Root Decay: Person has one or more root tooth surfaces with untreated decay.

Data Analysis:

- Weighted data.
- SUDAAN software (Release 7.0).
- A critical value of .01 used in assessing analytical comparisons.
- Logistic analyses used in multivariate analyses of dichotomous health outcomes.
- Reference populations: white non-Hispanic, female, average age, higher SES, with a recent dental visit.

❑ Results

Descriptive

Table 2 shows estimates of selected oral health indicators for Mexican-Americans and White non-Hispanics, along with their appropriate standard errors, and p-values for pertinent pairwise comparisons.

Are There Disparities in Oral Health Status between Mexican-American and White non-Hispanic adults?

Overall, in 1988 through 1994, Mexican-American dentate adults were more likely than were White non-Hispanic dentate adults to have untreated coronal decay (2.2x), untreated root decay (1.4x), gingivitis (2.0x), and RTCs involving pulpal pathology or retained roots (2.6x). See unadjusted odds ratios in Figures 2-3.

Conversely, Mexican-American adults were less likely than were White non-Hispanic adults to have gingival recession (1.8x), loss of periodontal attachment of 4+mm (1.2x), RTCs involving intracoronal restorations (1.8x, Figure 3), and RTCs involving gross loss of tooth structure (1.7x).

Mexican-American adults were 2.8 times less likely to have had a dental visit during the previous 12 months than were White non-Hispanic adults (Figure 3).

The largest unadjusted disparities were found for a recent dental visit and RTCs involving pulpal pathology or retained roots (ORs=2.8 and 2.6, respectively). Differences in the likelihood of having LOA of 4+mm and untreated root decay were much smaller (ORs=1.2 and 1.4, respectively).

Do Variations in Age, Gender, SES and a RDV account for the Disparities?

Adjusting for age and gender alone in some cases (e.g. RDV) partially explained the Mexican-American/White non-Hispanic disparities. In one case (untreated root decay), controlling for age and gender actually increased the disparity (Figures 2-3).

However, after adjustment for age, gender and SES, differences in untreated coronal decay, untreated root decay, RTCs involving pulpal pathology or retained roots were no longer statistically significant (Figure 2).

Differences in the likelihood of having any gingivitis, RTCs involving intracoronal restorations, and a recent dental visit were only partially explained by SES (Figure 3).

Controlling for a recent dental visit as well as age, gender and SES had little additional effect on any of the disparities described in Figures 2 and 3.

Evaluation of Potential Interactions

Table 3 presents the results of tests for two-way interactions between race/ethnicity and age, gender, SES, and a recent dental visit.

Figure 4 provides a brief commentary on each of the significant two-way interactions highlighted in Table 3.

Race-Ethnicity, SES and Edentulism

The interaction between race-ethnicity and SES with respect to the likelihood of edentulism is striking. Several aspects of this interaction are discussed in another poster in this session. The following extended comments highlight further aspects of this interaction bearing on Mexican-American/White non-Hispanic disparities in edentulism. The pertinent data are shown in Table 4.

Among each SES-specific group of Mexican-American adults shown in Table 4, the likelihood of being edentulous was similar to what it was among higher SES white non-Hispanics (the reference population).

Among adults with lower, lower middle, and upper middle SES, Mexican-Americans were, respectively, 6.9, 3.3, and 3.0 times less likely to be edentulous than were their White non-Hispanic counterparts.

Among Mexican-Americans themselves, the likelihood of edentulism was similar among those with lower and lower middle SES.

The likelihood of edentulism in each of the latter two (lower and lower middle SES) Mexican-American groups was greater than it was for their counterparts in upper middle and higher SES groups.

Among Mexican-Americans with higher SES, the likelihood of edentulism was lower than it was for Mexican-Americans with upper middle SES.

The overall adjusted odds ratio showed that Mexican-Americans were 7.9 times less likely to be edentulous than White non-Hispanics. However, this estimate of the magnitude of the disparity in favor of Mexican-Americans comes close to describing the disparity only for the higher SES category (OR=0.13, reflected OR=7.7). Mexican-Americans in the upper middle SES category were only 1.3 times less likely to be edentulous and Mexican-Americans in the lower SES and lower middle SES categories were respectively 1.5 and 1.6 times more likely to be edentulous than higher SES White non-Hispanics.

❑ Conclusions

There are disparities in oral health status between Mexican-American and White non-Hispanic adults. The largest (unadjusted) disparities were found for the likelihood of having a recent dental visit and RTCs involving pulpal pathology or retained roots.

Some of the observed disparities were accounted for by variations in socioeconomic status. These include the likelihood of having untreated coronal decay, untreated root decay, and RTCs involving pulpal pathology or retained roots.

Certain other disparities related to the likelihood of having gingivitis, and RTCs involving intracoronal restorations were only partially explained by SES even after controlling for a recent dental visit.

After controlling for variations in the age, gender and SES composition of the two populations, Mexican-American adults remained less likely to have had a dental visit in the 12 months prior to their NHANES III examination than White non-Hispanic adults.

Two-way interactions between racial-ethnic background and age, gender, SES and a recent dental visit exist for some of the oral health variables studied. The importance of taking these interactions into account is clearest in the case of the likelihood of edentulism. Ignoring the interaction between race-ethnicity and SES in this instance would give a biased estimate of the disparity in edentulism for all but the higher SES category of Mexican-Americans and White non-Hispanics.

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Table 1: Percent Distribution of Persons 35 Years and Over and of Dentate Persons 18 Years and Over, by Selected Demographic Characteristics According to Race-Ethnicity: United States, 1988-1994		
Demographic	*Persons 35 Years and Over*	*Dentate Persons 18 Years and Over*

Characteristics	*All*	*Mexican-Americans*	*White Non-Hispanic*	*All*	*Mexican-American*	*White Non-Hispanic*
All Persons	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
	Percent Distribution					
Gender						
Male	46.3	49.6	46.8	47.9	52.6	47.9
Female	53.7	50.4	53.2	52.1	47.4	52.1
Age (in years)						
18-24	____a	____a	____a	15.7	24.6	14.0
25-34	____a	____a	____a	25.0	30.8	24.2
35-44	34.4	46.9	32.1	23.4	22.0	23.0
45-54	21.6	24.6	21.7	13.7	11.3	14.4
55-64	18.3	15.2	18.4	10.2	6.5	10.8
65+	25.7	13.3	27.8	12.0	4.8	13.8
SES						
Lower	19.5	49.6	15.1	17.9	50.0	11.9
Lower Middle	24.0	25.4	23.2	25.3	26.0	24.1
Upper Middle	23.6	13.2	25.1	25.1	13.0	27.0
Higher	32.9	11.9	36.6	31.8	11.0	37.1
Recent Dental Visit						
Yes	51.5	37.9	54.5	54.4	34.4	59.0
No	48.5	62.1	45.5	45.6	65.6	41.0

[a] Does not apply.
Source: NHANES III.

Figure 1. Construction and Classification of Summated SES Index Scores For Persons 18 Years and Over Based on Individual Educational Attainment and the Ratio of Annual Family Income to the Official Poverty Threshold: United States, 1988-1994

Individual Educational Attainment	***Ratio of Annual Family Income to the Poverty Threshold***						
	< .5 (1)[a]	**.5 - .9 (2)**	**1.0 – 1.9 (3)**	**2.0 – 2.9 (4)**	**3.0 – 3.9 (5)**	**4.0 – 4.9 (6)**	**≤ 5.0 (7)**
< 8 Years (1)[a]							
8 Years (2)							
9-11 Years (3)							
12 Years (4)							
13-15 Years (5)							
16 Years (6)							
≥17 Years (7)							

Source: NHANES III
[a]Item scores used in summations.

Table 2. Selected Oral Health Indicators for Persons 35 Years and Over and Dentate Persons 18 Years and Over by Race-Ethnicity: United States, 1988-1994

Oral Health Indicator	**Mexican-American**		**White Non-Hispanic**		**Pairwise Comparison**
	Percent of Persons (SE)		*Percent of Persons (SE)*		*P-value*
35 Years and Over					
Edentulism	2.4	(0.19)	10.9	(0.68)	.0000
Dentate 18 Years and Over					
Untreated Coronal Decay	40.3	(0.95)	23.8	(1.18)	.0000
Untreated Root Decay	14.4	(0.76)	10.6	(0.53)	.0002
Any Untreated Decay	40.9	(0.91)	25.1	(1.27)	.0000
Gingivitis	66.9	(2.13)	50.4	(2.40)	.0000
Gingival Recession	34.0	(1.13)	47.7	(0.96)	.0000
Loss of Attachment 4+mm	20.7	(0.95)	24.4	(0.99)	.0070
Advanced Loss of Attachment	13.4	(0.73)	15.5	(0.78)	.0383
One or More RTCs [a]	33.4	(1.01)	37.1	(1.81)	.0594
Intracoronal RTCs	19.4	(0.90)	30.3	(1.84)	.0000
Crown and Bridge RTCs	4.0	(0.38)	3.9	(0.40)	.9431
Gross loss of Tooth Structure RTCs	3.5	(0.37)	5.9	(0.56)	.0020
Pulpal Pathology RTCs	12.8	(0.82)	5.3	(0.51)	.0000
Recent Dental Visit	34.4	(1.3)	59.0	(1.3)	.0001

[a] Data on these five RTC indicators are for dentate persons 18-74 years.

Source: NHANES III.

Table 3. P-Value for Satterthwaite-Adjusted F-Statistic for Potential Two-Way Interactions Between Race-Ethnicity and Age, Gender, SES, and a Recent Dental Visit for Selected Oral Health Characteristics Among Dentate Persons 18 Years and Over: United States, 1988-1994

Oral Health Characteristic	**Test of Potential Interaction Between Race-Ethnicity and:**			
	Age	*Gender*	*SES*	*Recent Dental Visit*
	P-Value			
Persons 35+ Years				
Edentulism	.1305	.0629	**.0040**	____[a]
Persons 45+ Years				
Edentulism	.1683	.0807	**.0106**	____[a]
Dentate Persons 18+ Years				
Recent Dental Visit	.0458	.6909	.086_	____[a]
Untreated Coronary Decay	.4379	.0208	.2785	.0246
Untreated Root Decay	.5368	.1871	.2811	.1914
Any Untreated Decay	.2440	**.0050**	.2906	.0291
Gingivitis	.0308	.4906	.3813	.0210
Gingival Recession	.3655	**.0004**	.3310	.3762
LOA 4+mm	.5999	.2309	.3351	**.0119**
Advanced LOA	**.0002**	.5306	.1067	.0420
Dentate Persons 18-74 Years				
One or More RTCs	**.0110**	.3379	.5673	.2154
RTCs involving IC	.0344	.0538	.0842	.1806
RTCs involving CB	.5525	.4344	.8645	.6022
RTCs involving GL	.5037	.4392	.3600	**.0043**
RTCs involving PR	.3412	.6308	.2134	.0454

[a] Does not apply.

Source: NHANES III.

Figure 4. Comments on Two-Way Interactions Between Race-Ethnicity And Selected Demographic Characteristics Identified in Table 3

Interaction Between Race-Ethnicity and:	With Respect to Likelihood of:	For Persons	Comments
Age	Advanced Loss of Attachment	18+ Dentate	The likelihood of advanced LOA among one or more racial-ethnic categories of persons 18-24 years is different from one or more older age categories. When persons 18-14 years are excluded from the analysis there no longer is a significant interaction (p-value=.18 for persons 25 years and over).
	One or more Restorations and Tooth Conditions	18 - 74 Dentate	Here too the interaction reflects the different situation for some racial-ethnic categories of persons 18-24 years of age. When the analysis focuses on persons 25 years and over, there no longer is a significant interaction (p=.06).
Gender	Any Untreated Dental Decay	18+ Dentate	The likelihood of any untreated dental decay (relative to the reference population) was similar among M-As and WnH males, but among females was greater for Mexican-Americans than among White non-Hispanics.
	Gingival Recession	18+ Dentate	Compared to the reference population (WnH females), Mexican-American males were equally likely, but Mexican-American females were 1.9 times less likely to have any ginvival recession. However, among males, Mexican-Americans were less likely to have any recession than White non-Hispanics.
A Recent Dental Visit	LOA of 4mm or greater	18+ Dentate	Compared to the reference population (WnH with a recent dental visit), Mexican-Americans with and without a recent dental visit were similar with respect to the likelihood of having any LOA 4+mm. However, among persons without a recent dental visit, compared to the reference population, MAs were slightly less likely to have any LOA 4+mm than were WnHs.
	One or more RTCs Involving Gross Loss of Tooth Structure	18-74 Dentate	Compared to the reference population (WnH with a recent dental visit), MAs without a recent dental visit were 1.3 times more likely to have any tooth conditions involving gross loss of tooth structure. Their White non-Hispanic counterparts were 2.8 times more likely to have any of these kinds of tooth conditions.
Socioeconomic Status	Edentulism	35+	In NHANES III no Mexican-American adult under age 35 was edentulous. See extended Discussion of this interaction below.

[a] Does not apply.

Source: NHANES III.

Table 4. Likelihood of Edentulism Among Mexican-American and White non-Hispanic Adults by Socioeconomic Status: United States, 1988-1994

Selected Racial-Ethnic Backgrounds and SES	Odds Ratio [a]	99% C.I.	Selected Pairwise Comparisons
Lower SES			
Mexican-American	1.5	0.9 – 2.4	.00000
White non-Hispanic	10.3****		
Lower Middle SES			
Mexican-American	1.6	0.8 – 3.2	.00002
White non-Hispanic	5.3****		
Upper Middle SES			
Mexican-American	0.8 [b]	.31 – 1.9	.0015
White non-Hispanic	2.3****		
Higher SES			
Mexican-American	0.13 [c]	.01 – 1.7	.039
White non-Hispanic	1.0****		

[a] Compared to reference population: higher SES WnH who were female and average age.
[b] When reflected, MAs in the upper middle SES were 1.3 times less likely to be edentulous than the reference population.
[c] The reflected odds ratio indicates that higher SES Mexican-Americans were 7.7 times less likely to be edentulous than the reference population.
****p-value .00001
Source: NHANES III.